Grain Size Gradation: Uniformity and Curvature Coefficients

Coefficient of uniformity and coefficient of curvature from D10, D30 and D60 of a grain size curve, with the well-graded check for sands and gravels.

Method: Grading coefficients; Hazen's formula

Input parameters

Unit system: SI

Parameter	Value	Unit
Size at 10 % passing	0.15000	mm
Size at 30 % passing	0.45000	mm
Size at 60 % passing	1.2000	mm
Soil type for the grading check	Sand (Cu ≥ 6)	

Calculated results

Parameter	Value	Unit
Coefficient of uniformity	8.0000	
Coefficient of curvature	1.1250	
Well graded (1) or not (0)	1.0000	
Hazen permeability estimate (C = 100 in cm/s with D10 in cm)	0.022500	cm/s

Notes for this case

• C_u = D_{60}/D_{10}, C_c = $D_{30}^2/(D_{10}D_{60})$. The Unified system calls sands well graded with C_u ≥ 6 and 1 ≤ C_c ≤ 3 (gravels C_u ≥ 4). Hazen's k ≈ $100 \cdot D_{10}^2$ cm/s (D_{10} in cm) is a rough estimate for clean, loose sands only.

Formula and method

$$C_u = \frac{D_{60}}{D_{10}}, \quad C_c = \frac{D_{30}^2}{D_{10} D_{60}}, \quad k_H \approx 100 D_{10}^2$$

Variables

D_{10}	Size at 10 % passing	m
D_{30}	Size at 30 % passing	m
D_{60}	Size at 60 % passing	m
soil	Soil type for the grading check	-
C_u	Coefficient of uniformity	-
C_c	Coefficient of curvature	-
$\mathrm{well\ graded}$	Well graded (1) or not (0)	-
k_H	Hazen permeability estimate (C = 100 in cm/s with D10 in cm)	m/s

Method and standards

Gradation.

Assumptions and limits

- Continuous grading curve.

References

Grading coefficients; Hazen's formula

Report details

Report reference	FCC-2MC6-KYEQ (the same inputs always give the same reference)
Generated	23 November 2026, 17:42 UTC
Calculator	Grain Size Gradation: Uniformity and Curvature Coefficients
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/geotechnical/gradation-coefficients

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.